



Contribution ID: 321

Type: **Poster Presentation**

## Dark Coupling: Cosmological implications of interacting dark energy and dark matter fluids

“The true nature of the dark sectors of the universe (dark matter and dark energy), and its implications for cosmology has eluded physicists for decades. In this study, we will consider some cosmological models where dark matter and dark energy are coupled fluids which may interact with each other. Assuming various dark couplings, we will use the background Friedmann equations to predict how these couplings affect the expansion history and age of the universe, as well as the evolution of the Hubble and deceleration parameters. The coupled models will then attempt to address the coincidence problem (regarding the current observed ratio of dark matter to dark energy today). These results will also be compared with the standard uncoupled  $\Lambda$ CDM model where dark energy is assumed to be a cosmological constant. Finally, since any good model should coincide with data, we will constrain these models with Type-Ia Supernovae data from a previously developed Markov Chain Monte-Carlo (MCMC) simulation”

**Apply to be considered for a student ; award (Yes / No)?**

Yes

**Level for award;(Hons, MSc, PhD, N/A)?**

MSc

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**Session Classification:** Astrophysics

**Track Classification:** Track D1 - Astrophysics